

## **DETAILED ACTION**

Claims 1-20 are pending in the instant application.

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 1, 2011 has been entered.

### ***Claim Rejections - 35 USC § 103***

Claims 1-10 and 17-20 were previously rejected under 35 U.S.C. 103(a) as being unpatentable over Drinkard et al. (USPN 3,356,748) in view of Fischer et al. (USPN 6,242,633) and Jungkamp et al. (WO 02/26698).

The Applicant's arguments have been considered, but have not been found to be persuasive for the following reasons.

Firstly, while Jungkamp et al. do not teach a distillation example with the exact pairs of pentenenitrile isomers as in claim 1 and the dependent claims, Jungkamp et al. appreciates that the claimed isomers would be in a reaction mixture generated from the direct hydrocyanation of 1,3-butadiene with hydrogen cyanide. See page 1, lines 40-47.

Jungkamp et al. teaches that by azeotropic distillation, groups of pentenenitrile isomers can be separated because their relative volatility ratio ( $\alpha$ ) will be higher than without the addition of water. See page 1, lines 6-13. The implication is that the

addition of water, or another diluent to form an azeotrope, is not specifically necessary if the relative volatility ratio (alpha) is higher than 1.3. The relative volatility between Z-2M2BN and 2M3BN is 1.12. Therefore, from looking at the teachings from Jungkamp et al. shown above, Jungkamp et al. would suggest that azeotropic distillation would be effective at separating this pair of isomers. Additionally, the claims do not exclude the addition of water to the mixtures as the mixtures are described in open language by virtue of the term “comprising.” Therefore, additional components, such as water, can be present.

Jungkamp et al. additionally clearly suggest that the distillation can be accomplished under reduced pressure. While the most preferred way of distillation described in Jungkamp et al. is at atmospheric pressure, Jungkamp et al. teaches that the distillation can be carried out advantageously at a pressure ranging from 1 to 200 kPa. See page 5, lines 24-26. As 1 bar is equal to 100 kPa, the range taught by Jungkamp et al. clearly contains the instantly claimed range of pressures.

Even though the Applicant has shown in the instant specification that distillation efficiency is increased at lower pressures, the Examiner believes that the suggestion by Jungkamp et al. that the distillation may be done at lower pressures and the overall *prima facie* case for obviousness is stronger than the evidence of increased efficiency since any vacuum distillation apparatus may be used in the instantly claimed process.

Finally, the individual steps in the process are known in the prior art as evidenced in the rejection and the steps are performing the same function together as they would if

Art Unit: 1626

practiced individually as in the prior art. Therefore, it is not inventive to combine prior art elements unless that combination provides a new and unobvious result.

Therefore, the Examiner has considered the Applicant's arguments fully, but has not found them to be persuasive. The rejection is maintained

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-10 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drinkard et al. (USPN 3,356,748) in view of Fischer et al. (USPN 6,242,633) and Jungkamp et al. (WO 02/26698).

The claims are drawn to a process for preparing 3-pentenenitrile by isomerizing 2-methyl-3-butenenitrile over a catalyst and distilling the products away from each other. A dependent claim details that the 2-methyl-3-butenenitrile is generated by hydrocyanation of 1,3-butadiene and separating the reaction products by distillation.

Drinkard et al. teach the isomerization of 2-methyl-3-butenenitrile over a tetrakis(triethyl phosphite) nickel(0) catalyst in order to generate 3-pentenenitrile. See column 4, Example 1.

Drinkard et al. do not teach where the product nitriles are separated from each other by distillation and where the reactant stream comes from the hydrocyanation of 1,3-butadiene.

Fischer et al. teach the hydrocyanation reaction of 1,3-butadiene with a nickel phosphite catalyst to form pentenenitriles which include 2-methyl-3-butenenitrile. See Example 15, column 21.

Jungkamp et al. teach the azeotropic distillation of various pentenenitrile isomers with the pressures and temperatures required by the claims. See page 2, line 39 through page 3, line 6 and Table 1, page 7. Jungkamp et al. do not teach the exact

pairs of isomers that are listed in claim 1 nor does Jungkamp et al. teach the exact reactions that the mixtures come from.

It would be obvious to one of ordinary skill to take the method proven by Jungkamp et al. and apply it to other mixtures of pentenenitrile isomers as distillation techniques such as simple distillation, fractional distillation, vacuum distillation, and azeotropic distillation are well known in the art and are readily applied by the person of ordinary skill in purifying isomeric liquids from one another. As to the reaction that the mixtures come from, one of skill in the art would be able to complete the distillation irrespective for which reaction the mixture of pentenenitriles originated from.

Therefore the claims are *prima facie* obvious over the prior art.

### ***Conclusion***

Claims 1-10 and 17-20 are rejected.

All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph R. Kosack whose telephone number is (571)272-5575. The examiner can normally be reached on M-Th 6:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph McKane can be reached on (571)-272-0699. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joseph R Kosack/

Application/Control Number: 10/586,470

Page 8

Art Unit: 1626

Primary Examiner, Art Unit 1626